Case Study- DG Uses at Conectiv
Future Challenges & Opportunities

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Case Study- DG Uses at Conectiv

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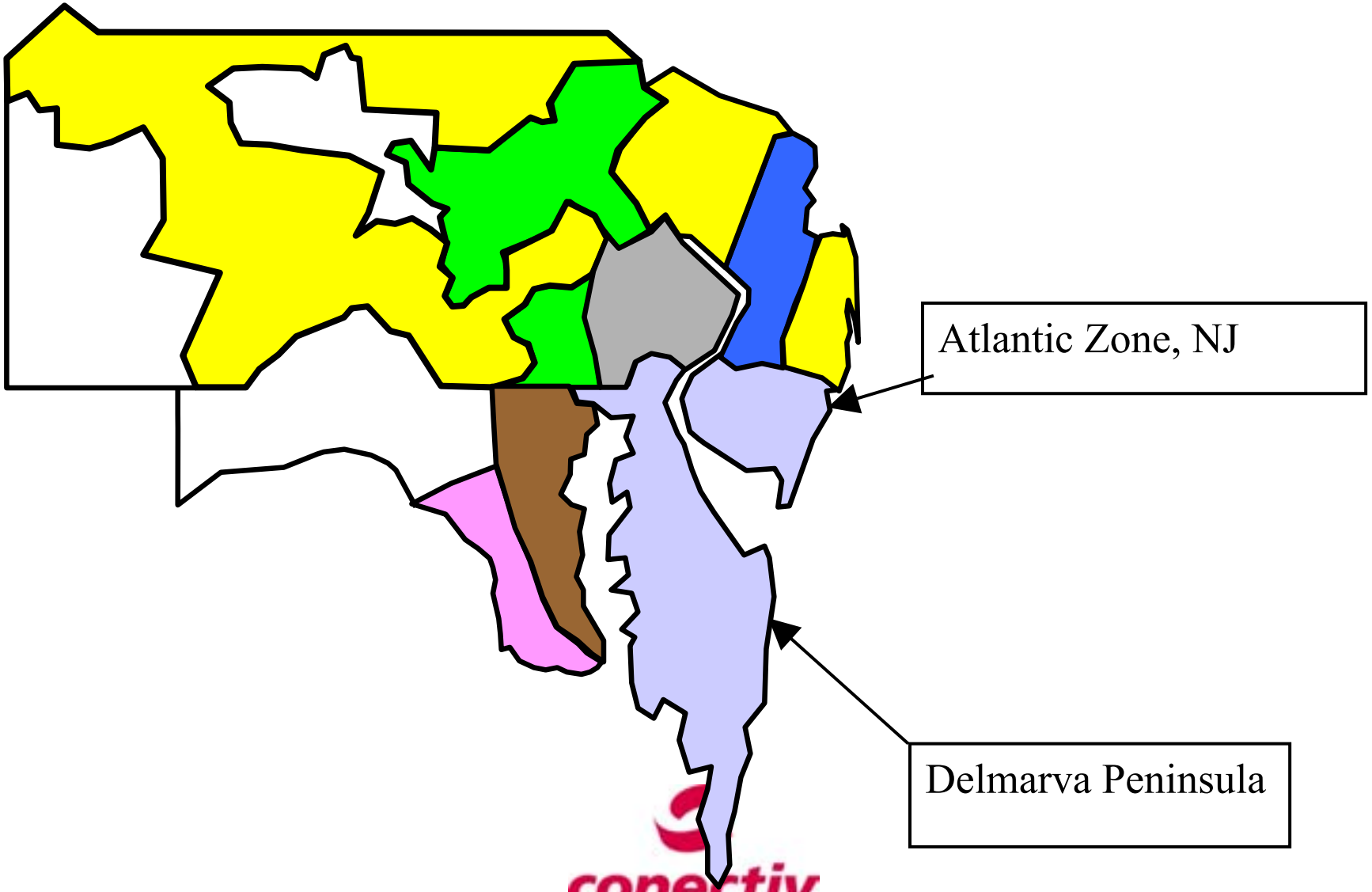
PJM - Conectiv Territory



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Introduction

A pole-less society in the year …….

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Presentation Outline

- Case Study - DG Uses at Conectiv
  - How and Where used
  - Derived Benefits
  - Challenges & Lessons Learned
- Future Challenges and Opportunities
  - Environmental Constraints
  - System protection
  - Value of output energy
  - New Technologies

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DG uses at Conectiv- How used

- Partial substitute for major unit outages
- Provide end-of-system support
- Provide temporary generation during system repair.

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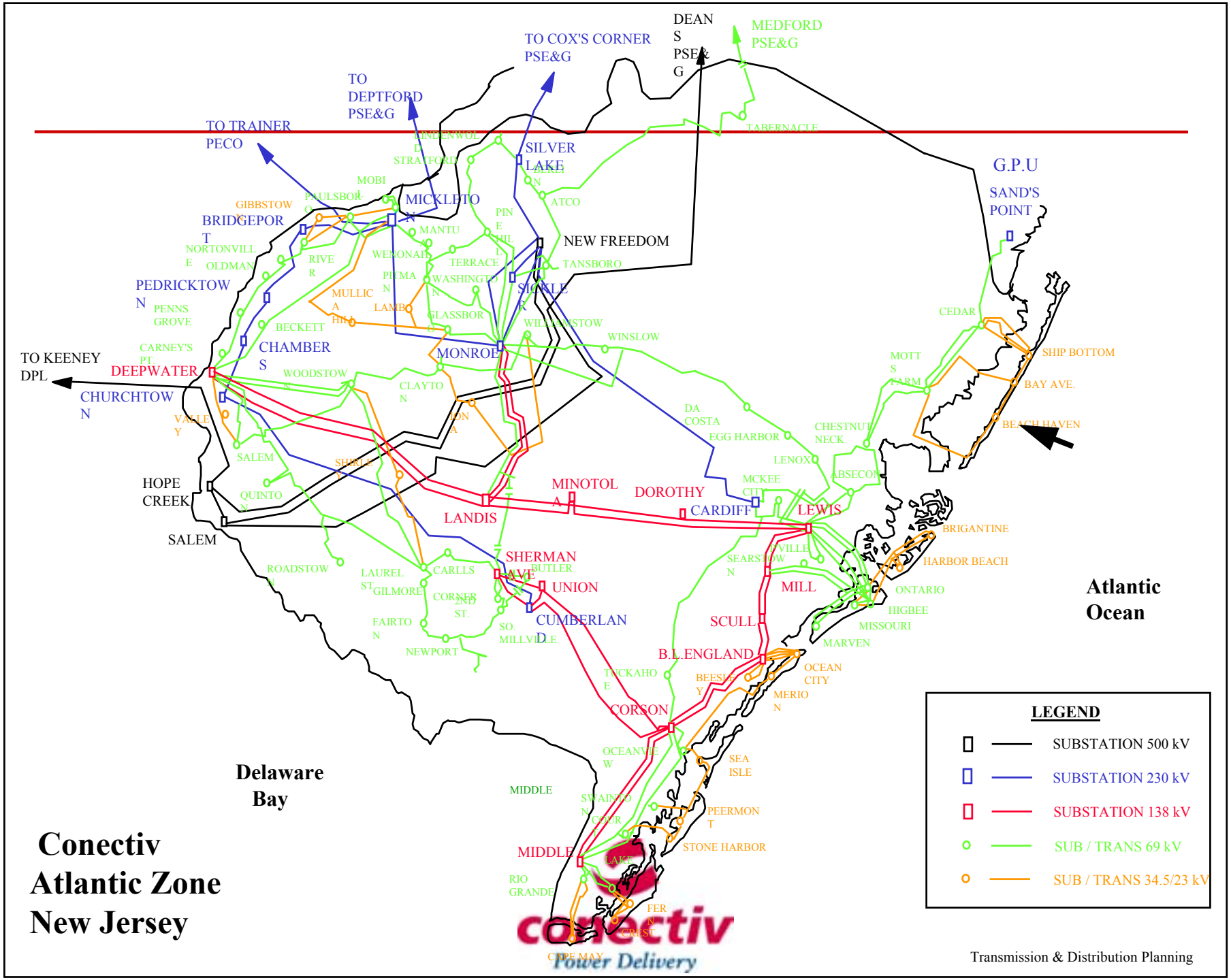
TO COX'S CORNER PSE&G
DEAN S PSE& G
MEDFORD PSE&G
TO DEPTFORD PSE&G
TO TRAINER PECO
TABERNACLE
LINDENWOLD
STRATFORD
SILVER LAKE
G.P.U
SAND'S POINT
MOBIL
PAULSBORO
GIBBSTOWN
MICKLETON
ATCO
BRIDGEPORT
MANTUA
NEW FREEDOM
NORTONVILLE
OLDMANS
RIVER
WENONAH
TERRACE
TANSBORO
PEDRICKTOWN
PITMAN
WASHINGTON
SICKLER
MULLICA HILL
LAMBO
GLASSBORO
PENNS GROVE
BECKETT
WILLIAMSTOWN
WINSLOW
CEDAR
CARNEY'S PT.
CHAMBERS
MONROE
SHIP BOTTOM
TO KEENEY DPL
DEEPWATER
WOODSTOWN
CLAYTON
MOTTS FARM
BAY AVE.
CHURCHTOWN
DA COSTA
BEACH HAVEN
VALLEY
EGG HARBOR
CHESTNUT NECK
SALEM
SHARPS
LENOX
HOPE CREEK
QUINTON
MINOTOLA
DOROTHY
MCKEE CITY
ABSECON
LANDIS
CARDIFF
LEWIS
BRIGANTINE
SALEM
SHERMAN AVE
VILLE
SEARSTOWN
HARBOR BEACH
ROADSTOWN
LAUREL ST
CARLLS
BUTLER
UNION
MILL
ONTARIO
GILMORE
CORNER
2ND ST.
HIGBEE
FAIRTON
SO. MILLVILLE
CUMBERLAND
SCULL
MISSOURI
NEWPORT
MARVEN
B.L.ENGLAND
TUCKAHOE
BEESLEY
OCEAN CITY
MERION
CORSON
OCEANVIEW
SEA ISLE
MIDDLE
SWAINTON
CAPE
PEERMONT
STONE HARBOR
MIDDLE
LAKE
RIO GRANDE
FER
CREST
CAPE MAY
Delaware Bay
Atlantic Ocean
Conectiv
Atlantic Zone
New Jersey
LEGEND
SUBSTATION 500 kV
SUBSTATION 230 kV
SUBSTATION 138 kV
SUB / TRANS 69 kV
SUB / TRANS 34.5/23 kV
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Transmission & Distribution Planning

DG uses at Conectiv- How & Where

- Partial Substitute for major unit outages
  - Installed 17.1 MW (Multiple 825KW Cummins & Detroit Diesel Units from GE) in 2000.
  - Installed 6 MW (3 -2 MW Cat Diesel Units, 5.4 MW Prime) in 2001.
  - All installations in the Southern portion of the Delmarva Peninsula.
  - All units located inside substations, most in remote locations.

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DG uses at Conectiv- How & Where

- Provide end-of-system support
  - Installed 6 MW in 2001 (4- 1.5 MW Cummins diesel units, 1.25 MW Prime).
  - Location: N/E portion of NJ service territory
  - Residential Neighborhood in a beach resort
  - Interesting politics at play.

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Beach Resort Installation

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DG uses at Conectiv -How & Where

- Provide temporary generation during system repair
  - Installed 1- 1.5 MW Cummins unit in early 2001.
  - Located on the load side of a cable crossing the Chester River
  - Unit served customers while radial 25 kV submarine cable terminal was being repaired.
  - Reduced customer outages from 8-9 hrs to two 5 minute outages.

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DG uses at Conectiv - Benefits

- Provides just enough system support to avoid problems due to loss of large units.
- Bridges the time gap between “planned” and “completed” system improvements.
- Reduces end-of-system load levels which reduces system losses & improves voltage.
- Cost effective when system is stressed.
- Improves Customer Service by reducing planned outage times.

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Challenges and Lessons Learned

- Challenges
  - Environmental permitting
  - NIMBY's
  - Internal skeptics
- Lessons learned
  - Trust the technology
  - Plan ahead for local opposition
  - Stay the course, be a DG champion

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Future Challenges & Opportunities

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Sr. Project Engineer, Distribution Planning

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Future Challenges

- Challenges for Grid Connected DG
  - Traditional Recip's and Small Turbines
  - New Technologies (Fuel Cells, Solar, Wind, Micro-turbines, Sterling Engines, etc.)
- Environmental
  - Permits not based on new engine performance
  - No Policy for grid connected operation
  - Net emissions effect unknown
  - General permit for utility emergency use anywhere on grid

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Future Challenges

- Siting
  - aesthetics, fuel source, local permitting, sound, emissions
- Price - for new technologies
- Fuel infrastructure for new technologies
- Coordination with Automatic Line Equip.
- Protective Coordination
- Momentary interruptions and load pick-up

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Future Challenges

- Planning and forecasting feeder load
- Assigning benefits from operating DG
- Net Metering for Micro-DG & Tariff Issues
- Level of Available Fault Current
- Operating a more complex system
- ROI risk in light of Central Gen capacity going long/short in cycles

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Future Opportunities

- Reduced Demand and Energy Costs
- Deferred T & D Upgrades
- Reduced System Losses
- Voltage Support
- Increased Reliability
- Use of rarely used assets (existing DG)
- Reduced emissions with new technology

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Future Opportunities

- Grid to become two way system for the benefit of customers that wish to export
- Electrical system equipment utilization increased by use of DG
- Higher utilization of back-up gens, car and truck power plants
- Lower cost controls, monitoring and communication to facilitate grid connected DG and interruptables

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Future Opportunities

- Utilities allowing 3rd party mini-gen owners to connect at existing substations
- Will all this lead to a pole-less society?

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